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Jim Baumann
ESRI

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GIS Helps Harvest the Dragon Seed

In an effort to establish regional coordination of demining activities in southeast Europe, the European Commission (EC) prepared and proposed a Geographic Information System (GIS) project called the "Geographical Information System for Mine Action in Southeast Europe" (GISMASE). The goal of the project is to create high-definition maps that will include the identification of mined areas and their socio-economic and security implications, as well as the development of GIS training capabilities so that the project can be locally supported.

by Jim Baumann, *ESRI*

ITF Efforts

The International Trust Fund for Demining and Mine Victims Assistance (ITF) is now in its fifth year of funding and monitoring the demining activities in southeast Europe, which includes the countries of Albania, Bosnia and Herzegovina, Croatia, Serbia and Montenegro, and Macedonia. Its website is located at http://www.see-demining.org/main.htm, where a full detailing of their programs can be found. This region has long suffered land wars and the inevitable resultant laying of landmines. It is estimated that more than two million mines and pieces of UXO were layed during the Balkan crisis alone. Between 18,000 and 20,000 kg of UXO, primarily from World War I, are found and neutralised annually in Slovenia.

Before the ITF began its efforts to monitor and finance demining activities in southeast Europe in 1999, there was no regional coordination of those activities. Each neighbouring country had its own approach towards mine removal and there was a general lack of opportunity to coordinate those activities, as well as exchange information and experience. Upon the formation of the ITF, the EC prepared and proposed a GIS project called GISMASE, which was jointly funded by the EC and the U.S. Department of State (DOS) and implemented by the ITF under the scientific guidance and monitoring of the EC's Joint Research Centre (JRC).

The GISMASE Project

The goal of the GISMASE project is to create high-definition maps that will include the identification of mined areas and their socio-economic and security implications, as well as the development of GIS training capabilities so that the project can be locally supported. Borut Jagarinec of the ITF comments, "The problem with developing a regional GIS in southeast Europe stems from the fact that there are different organisations operating in the region and there is a need to collect, integrate and synthesize the information collected by these different sources, which, unfortunately, have frequently used different methods, systems, formats, etc., for assembling and structuring their data. One of the major tasks of the GISMASE project is not the unification of the GIS systems currently being used in the region, but the development and improvement of the regional landmine information systems (including GIS) so that information on minefields, surveys and incidents as well as

other background information is all stored in a compatible format and can be exchanged between those organizations participating in the project." The Environmental Systems Research Institute's (ESRI's) GIS software used in the project includes: ArcGIS, ArcInfo, ArcView, ArcView Spatial Analyst, ArcIMS, and ArcEurope Base Map and Demographics.

The ITF has adopted a multi-resolution approach to the mapping of mined areas to satisfy the diverse range of requirements that cover different spatial scales. The requirements range from regional planning (1:100,000 scale maps) to tactical needs (1:25,000 scale maps) and the detailed mapping and monitoring of mine clearance operations in the field (1:5,000 scale). For low-resolution coverage of the entire region, orthorectified Landsat 7 satellite imagery with a land cover classification and change detection for 1990–2000 was used.

On top of these coverages, basic vector layers found in ESRI's ArcEurope BaseMap, as well as data from other sources (including minefield positions, soil type, slope, land cover, country boundaries, utilities, roads, railways and rivers) are used for analysis. Surveys, incidents and background information acquired through regular regional information exchanges are also included in the GIS.

The ITF plans to employ the internet to share its data with other participants in the project and will use ESRI's ArcIMS server to distribute that data. Jagarinec concludes, "Landmines are one of the last remaining plagues in the world and we are trying very hard using a variety of methods—including GIS technology—to eliminate them."

About the Author

Jim Baumann writes about international GIS-related topics for ESRI. He has written articles on various aspects of the computer graphics industry and information technology for more than 15 years.

Contact Information

Jim Baumann
ESRI
380 New York Street
Redlands, CA 92373-8100
Tel: 909-793-2853, ext: 1807
Fax: 909-307-3051
E-mail: jbaumann@esri.com